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METHODS OF SECURING BETTER CO-OPERATION BETWEEN GOVERNMENT AND LABORATORY ZOOLOGISTS IN THE SOLUTION OF PROBLEMS OF GENERAL OR NATIONAL IMPORTANCE¹

THE Zoological Division of the Bureau of Animal Industry of the Department of Agriculture is particularly concerned with that branch of zoology commonly known as parasitology. The Animal Husbandry Division of that Bureau has a special interest in genetics, but as this is a subject that is receiving a good deal of attention from university zoologists at the present time the opportunities for cooperation with respect to the zoological work of the Animal Husbandry Division are perhaps better than they are with respect to the work of the Zoological Division. In any case it is not my purpose to consider the question of cooperation on problems in the field of genetics and my remarks on this occasion are made with reference to the possibility of securing closer cooperation between universities and the Department of Agriculture in research work in the field of parasitology.

The work of the Zoological Division consists chiefly in the investigation of the parasites of domestic animals and of those trans-

¹ A symposium before the American Society of Zoologists, held at Baltimore on December 26, 1918, Professor C. E. McClung presiding, included papers and discussions as follows: Representing the Bureau of Entomology, Dr. L. O. Howard. Discussion by J. G. Needham. Representing the Bureau of Fisheries, Dr. Hugh M. Smith. Discussion by Dr. H. B. Ward. Representing the Bureau of Animal Industry, Dr. B. H. Ransom. Discussion by Dr. Herbert Osborn. Representing the Bureau of Biological Survey, Dr. E. W. Nelson. Discussion by Dr. R. K. Nabours. Relation of the Council of National Defense and the National Research Council to the Advancement of Research, Dr. John C. Merriam.

missible from domestic animals to man with the purpose of establishing methods for their control and eradication. The welfare of the live-stock industry, the public health, and other large national interests are dependent in no small measure upon the suppression of diseases caused by animal parasites as well as those of bacterial origin. The results of scientific research in the field of parasitology have in repeated instances supplied the knowledge necessary to bring about the eradication or control of disease. Many problems in this field remain to be solved. From a practical standpoint therefore parasitology is a highly important branch of zoology. It has, however, not been popular among American zoologists and there are few universities in this country where graduate students have favorable opportunities for acquiring the working knowledge essential for the practical parasitologist. Parasitology of course is a very special branch of zoology and it is not to be expected nor is it desirable that a large number of specialists should be trained for research in parasitology, but I believe that the present and future needs of the country are sufficient to justify more attention to this subject by zoologists than has heretofore been given. The Zoological Division has always had difficulty in securing the services of properly qualified men to carry on its work. The neglect of parasitology by zoologists is no doubt largely responsible for this condition. Low salaries and other objectionable features of government service, real and imagined, may have contributed to the difficulty of maintaining our scientific staff. University professors however, and especially subordinates to the heads of departments of universities have not fared better with respect to salary than men in corresponding positions in scientific branches of the government service, and the red tape and other troubles that worry government scientists are no more disagreeable than some of the things endured by the scientific man in the university.

In the face of the evident fact that parasitology is a subject with which American zoologists have comparatively little to do at

present, what are the possibilities of cooperation between the universities and the Bureau of Animal Industry with respect first to the training of parasitologists for government service and second to research in university laboratories on problems of parasitology likely to yield results of direct or indirect value to the work of the Bureau of Animal Industry in the suppression of parasitic diseases?

Although extensive cooperation can scarcely be undertaken under existing conditions it should nevertheless be possible to bring the universities and the Bureau of Animal Industry into closer contact with resultant benefit to both. It is hardly worth while at present to speculate upon the extent to which cooperation between the two may be developed in the future as it will necessarily be dependent upon the course of development of the general policy of cooperation in scientific work between the universities and the government. I shall therefore only venture a couple of suggestions as to what might be done immediately toward securing more effective cooperation than has existed in the past. These suggestions should be taken as suggestions only and not as the fixed policy of the Bureau and Department with which I am associated, although it may be stated that there is nothing particularly novel about them and I see no reason why they should be objectionable from a departmental standpoint. One plan that has occurred to me is essentially simple, namely, to give a limited number of graduate students specializing in parasitology the opportunity of studying in the laboratory of the Zoological Division for a limited period of time in each case. Much could not be promised in the way of personal instruction and such students therefore should have demonstrated their ability to work more or less independently. Ordinarily perhaps not more than one student at a time could be thus accommodated. It is likely that arrangements could be made for the payment of a salary in return for what service the individual was able to render the division during the time he spent in the laboratory, so that his laboratory experience need cost him nothing. A plan of

this kind would naturally involve some trouble from the standpoint of administration of the work of the division, but I believe the fact that it would give the chief of the division an opportunity to become acquainted with students of parasitology who might later desire to enter the service and thus enable him to form an opinion as to their capabilities and suitability for the work would offset any inconveniences resulting from their presence in the laboratory. The student himself would not only profit from what knowledge of parasitology he was able to gain during his stay in the laboratory, but he would also be able to determine better than he might otherwise whether he would care later to take a position in the division.

As to possibilities of cooperation between university departments of zoology and the Bureau of Animal Industry in research work on problems relating to parasitic diseases it would be quite feasible in some cases for the bureau within certain limits to assist financially or otherwise in investigations likely to yield results of value to the live-stock industry of the country. The exact nature of cooperative arrangements which might be made in any instance would depend largely upon the special conditions of the individual case, and nothing would be gained by discussing plans of cooperation at this time. Without going into details I may therefore limit myself to an expression of the willingness of the bureau to cooperate with university zoologists in investigations in the field of parasitology in any way possible.

My remarks have been very brief but if the suggestions I have offered are of any value more elaborate discussion can be left for other occasions, if they are not the brevity of their presentation is not to be regretted. In any case I am very glad to have had this opportunity of speaking a word for practical zoology, of expressing the belief that it deserves more attention from the zoological profession in this country than it has hitherto received, and of pointing out certain ways by which it may be possible to bring about better

cooperation between the universities and the government in zoological research.

B. H. RANSOM

BUREAU OF ANIMAL INDUSTRY

DR. RANSOM'S paper suggests several topics for discussion and is certainly opportune.

It is probably true that the subject of parasitology has been neglected in large measure in our colleges and universities but I can hardly agree that it is due to lack of interesting phases of the subject. No doubt tapeworms are less attractive than birds or butterflies, but when we take into account their remarkable adaptations and the complex adjustments involved in their alternations of host they offer most fascinating points for biologic study, and to this may be added their economic interest. In my own experience I have usually found that students respond very promptly to discussion of these aspects of parasitic biology.

As to the dearth of workers there is something to be said in the matter of demand. In my own experience I have often had students who became interested in the subject but the great majority of our university students have to meet the practical problem of entering on work that will bring them a living income and it has usually been the case that when this feature was met the man would find more attractive openings in teaching or research in other lines.

As to practical lines of cooperation I think Dr. Ransom has made a suggestion that is practicable and quite feasible. Advanced students and especially graduates working on theses or dissertations might very profitably be assigned for a specified time to work in the bureau laboratories or for field work, perhaps utilizing their summer vacations as is done in geology or entomology with perhaps joint supervision of bureau and university department so that there may be opportunity for university credits.

Courses in parasitology have been offered in a number of institutions especially in recent years but I am not posted as to the extent of enrollment. However, any figures for recent years would be of little value as showing drift to these courses. I believe some of the men

with this training have found place in government service along lines related to their specialty but how many I could not say.

Teachers may very profitably emphasize the features of parasitism that afford examples of biologic adaptation and in medical and agricultural applications and this should serve to aid in the application of the bureau results.

I believe a very useful aid in this work would be for the bureau to furnish to the laboratories, willing to cooperate, a condensed manual for the more essential technique in the preparation of material for study and keys for identification of species most commonly met with in laboratory work.

The laboratory guides of Braun & L  he: Stitts; and Herms, and Pratt's indispensable "Manual of Invertebrates" are of course available and are no doubt very generally used but they are more likely to fit into special or advanced courses and a simple hand-book, in mimeograph form if desired, available for use in some of the more general courses would, I believe, help to stimulate interest.

Possibly an outline of a course in parasitology arranged by a conference between representatives of bureau and university teachers might help especially if such outline indicated what special problems could be worked to advantage in any particular locality. Also the employment of advanced students in the routine duty of collecting or preparing material for bureau use might be possible. A circular letter from the bureau to university departments suggesting work that might be done would be helpful, and I believe that suggestions to teachers as to the matter and form for best presenting to students and thereby to a larger public, the results of the bureau work might be of advantage.

Specific training of specialists for the bureau service might be facilitated by an understanding as to probable employment of men willing to enter the field as their life work.

I do not understand that the demand is wide enough, for the immediate future at least, to warrant many schools making a specialty of the subject but certainly a few schools with proper facilities might very profitably offer dis-

tinct courses preparing for such work and prospective students in this line could then be steered to such schools from other departments not emphasizing this phase of zoology.

Another thing which, speaking from the university side, seems to me worth considering would be the preparation of a moderate number of representative species of parasites for demonstration purposes in classrooms or laboratories or even the accumulation of certain abundant forms sufficient for laboratory dissections or study. The bureau doubtless has a large accumulation of duplicate material from which it would be possible to supply material where desired with perhaps the agreement that the department so supplied should contribute other material as it might become available.

While it often happens that a quantity of specimens of some particular species is found in great abundance I believe we will all agree that the securing of such material in condition and quantity for laboratory purpose is more difficult than for most other groups.

Perhaps my suggestions may seem to be rather one-sided, involving mostly assistance from the bureau to the university laboratories, but I believe that the bureau will find the university men ready and willing to cooperate and that they will welcome definite suggestions as to ways and means by which such cooperation may be established.

HERBERT OSBORN

OHIO STATE UNIVERSITY

THE THREATENED EXTINCTION OF THE BOX HUCKLEBERRY, *GAY- LUSSACIA BRACHYCERA*

THE box huckleberry (*Gaylussacia brachycera*) is a rare and beautiful American shrub which is in process of extinction. It is declared by Mr. Harlan P. Kelsey, the well-known landscape architect, of Salem, Massachusetts, that for many woodland situations it is the most beautiful native evergreen ground cover known to him. The biological problem is to preserve the wild plant from extinction and at the same time to bring it into horticultural use.

Two years ago the writer, desiring to ex-